

## **DHC-6 Twin Otter**

### **Standard Operating Procedures- Amplified**

The following standardized operating procedures have been developed to aid flight crews by specifying a progression of subtasks and actions to ensure the task is carried out in a manner that is efficient, logical and safe. The Standardized Operating Procedures- Amplified (SOPA) reflects the Aircraft Flight Manual (AFM), checklists, and other recommended practices. All Agency flight crews will utilize these SOPAs during all missions that require two pilots (All administrative flights and non-smokejumper fire Suppression flights with 10 or more passengers).

Checklists are CHECKLISTS, not DO LISTS. Pilots need to “do” the actions and then call for the checklist to ensure all items have been properly completed. This will require both flight crewmembers to be thoroughly familiar with the aircraft, the checklist items, and the flight profiles.

#### PREFLIGHT INSPECTION

- The preflight inspection will be performed by both crewmembers if at all possible.
- If both crewmembers are not available to perform the preflight, it is the Pilot in Command’s responsibility to ensure one of the flight crewmembers is assigned to perform the preflight.
- The preflight inspection will be accomplished in accordance with the Twin Otter expanded checklist in the AFM.

After the preflight inspection has been accomplished, all subsequent checklists will be performed by challenge and response except for those checklists that have been designated as silent. It is important to keep in mind that not every item should be verbally expressed due to the impact on the desired sterile cockpit environment. The pilot flying (or the PIC when on the ground) shall call for the appropriate checklist. The pilot not flying will read the challenge. The pilot flying will respond appropriately. What is written on the checklist is the proper response. If the response is not correct, the pilot not flying will give the appropriate response and both pilots will confirm that the correct action has been accomplished. When the pilot flying calls for a checklist that is silent, the pilot not flying will verbally call the checklist complete after all items have been accomplished.

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Upon receiving a dispatch, the PIC is responsible for a final walk around the aircraft to ensure all engine plugs, propeller ties, chocks, and tie downs have been removed and that all doors are secure.

The PIC will call for the BOARDING AIRCRAFT CHECK and the following specific items will be accomplished in a standard challenge/response format, with the SIC offering the challenge, and the PIC providing the proper response.

### **BOARDING AIRCRAFT CHECK**

PREFLIGHT INSPECTION COMPLETE

The PIC will confirm that the preflight inspection has been completed.

\*PASSENGER BRIEFING: COMPLETE

On a Smokejumper mission, a passenger briefing may not be necessary. On a passenger haul, the PIC will assure that a briefing has been given.

**The SIC will now state “Boarding Aircraft Check is complete, Before Starting check is next”. The PIC will then call for “Before Starting Check”**

### **BEFORE STARTING CHECK**

\*PARKING BRAKE: SET

The PIC will visually check that the parking brake is set.

FIRE T-HANDLES: IN

The PIC will check that both Fire T-Handles are in.

EMERGENCY FUEL SWITCHES: NORMAL

The PIC will check that both emergency fuel switches are in the Normal position.

EMERGENCY PUMPS: OFF

The PIC checks that the emergency boost pumps are selected to the off position.

FUEL SELECTOR: NORMAL

The PIC ensures that the Fuel Selector is in the NORM position.

BOOST PUMPS: OFF

The PIC will visually check that Boost Pumps are selected to the off position.

STATIC SOURCE: NORMAL

The PIC checks that the static selector is selected to normal.

**\*RADIO MASTER SWITCHES:** **BOTH OFF**

The PIC checks that both Radio Master Switches are selected to OFF.

**VENT FAN:** **OFF**

The PIC checks that the vent fan is selected off.

**RADIO CIRCUIT BREAKERS:** **CHECKED**

Both Crew Members shall visually check that the radio circuit breakers are all in.

**MAIN PANEL CIRCUIT BREAKERS:** **CHECKED**

The PIC does a visual and tactile check of both the circuit breakers on the panel to his left and overhead panel to ensure all CB's are closed/in.

**INVERTER SWITCH** **CHECKED**

The PIC will select the other inverter.

**DE-ICING SWITCHES:** **OFF**

The PIC scans the overhead panel and checks that the PROP DEICE, INTAKE ANTI ICE, WING INSP LT, DEICER BOOTS, and VALVE HTR switches are all in the off position.

**CABIN LIGHTING AND SIGNS:** **SET**

The PIC selects the NO SMOKING and FASTEN BELT switches to the appropriate Position.

**\* BEACON:** **ON**

The PIC will ensure that the external beacon is selected on.

**BLEED AIR SWITCHES:** **OFF**

The PIC will check that the Bleed Air switches are in the off position.

**PITOT HEAT:** **OFF**

The PIC checks that the pitot heat switches are selected off.

**\*GENERATOR SWITCHES:** **OFF**

The PIC checks that both generator switches are in the off position.

**BUS TIE SWITCH:** **NORMAL**

The PIC checks to ensure that the Bus Tie Switch is in the Normal position.

**FLAP HANDLE:** **UP**

The PIC checks that the flap handle is selected up.

**\*FUEL LEVERS:** **OFF**

The PIC checks that both of the fuel levers are in the off position.

**\*PROPELLER LEVERS:**

**FORWARD**

(In the Twin Otter, starting the engines with the propellers forward (as opposed to feather) allows a cooler start, and will result in a stabilized Ng of approximately 52%, as opposed to 48% if in feather.)

**\*POWER LEVERS:**

**FLIGHT IDLE**

The PIC checks that both power levers are in the flight idle position.

**WINDSHIELD HEAT & WIPERS:**

**OFF**

The SIC will check that the windshield heat switch and the windshield wiper switch are both in the OFF position.

**LANDING/PULSE LIGHTS:**

**OFF**

The PIC verifies the landing lights and pulse lights (N143Z only) are selected OFF. (This is important; the landing lights are a very high amp draw item.)

**IGNITION SWITCH:**

**NORMAL**

PIC verifies switch guard is down.

**\*D.C. MASTER:**

**ON**

The PIC selects the Master Switch to ON.

**\*EXTERNAL/BATTERY SWITCH:**

**BATTERY**

Before any start, whether using the battery or a Ground Power Unit, select BATTERY so you can check the condition of the battery.

**\*BUS VOLTAGE:**

**CHECKED (18 V Minimum)**

The PIC will visually check the battery voltage. Normal battery voltage is 24 VDC.

**CAUTION LIGHTS:**

**CHECKED**

The PIC will select the caution light switch to the TEST position and verify That all the lights on the central warning panel illuminate, as well as the beta Range lights, beta backup disarmed light, the autofeather indicator lights, the Stall warning light, and the stall warning horn.

**FIRE DETECTION:**

**TEST**

The PIC will select the fire detection test switch to TEST and verify that two red lights in each fire pull handle illuminate and the fire bell rings, then select the FIRE BELL MUTE switch to off to silence the bell.

**\*FUEL QUANTITY:**

**CHECKED**

The PIC checks that the proper amount of fuel is indicated on the fuel gauges.

**FUEL QUANTITY INDICATORS:****CHECKED**

A fuel quantity indicator pushbutton test switch is located adjacent to the fuel selector and is marked IND TEST. When pressed, the pointer should fall and indicate zero fuel. When the button is released, the pointers should resume the correct fuel quantity indication. Note that this test only examines the calibration of the indicators (the zero point of the dials themselves), and does not test the function or calibration of the fuel quantity probes.

**CROSSFEED:****CHECKED**

Turn the FUEL SELECTOR switch to BOTH ON FWD. Check that the BOOST PUMP 2 FWD PRESS and BOOST PUMP 1 FWD PRESS caution lights remain out, and the BOOST PUMP 2 AFT PRESS and BOOST PUMP 1 AFT PRESS caution lights come on. Listen for the sound of the fuel crossfeed valve operating.

Turn the FUEL SELECTOR switch to BOTH ON FWD. Check that the BOOST PUMP 2 AFT PRESS and BOOST PUMP 1 AFT PRESS caution lights go out, and the BOOST PUMP 2 FWD PRESS and BOOST PUMP 1 FWD PRESS caution lights come on.

Listen for the sound of the fuel crossfeed valve operating.

**EMERGENCY PUMPS:****CHECKED**

Lift up the STDBY BOOST PUMP EMER FWD switch. Check that the BOOST PUMP 2 FWD PRESS caution light goes out, and the BOOST PUMP 1 AFT PRESS caution light stays on. Listen for the sound of the boost pump running. Return the switch to the OFF position.

Lift up the STDBY BOOST PUMP EMER FWD switch. Check that the BOOST PUMP 2 AFT PRESS caution light goes out, and the BOOST PUMP 1 AFT PRESS caution light stays on. Listen for the sound of the boost pump running. Return the switch to the OFF position.

**BOOST PUMPS:****TEST**

Press down and hold the RWD BOOST switch. Check that the BOOST PUMP 2 FWD PRESS caution light goes out, and that the BOOST PUMP 1 FWD PRESS caution light stays on. Listen for the sound of the boost pump running. Release the switch.

Press down and hold the AFT BOOST Switch. Check that the BOOST PUMP 2 FWD PRESS caution light goes out, and the BOOST PUMP 1 AFT PRESS caution light stays on. Listen for the sound of the boost pump running. Release the switch.

**\*BRAKE/HYDRAULIC PRESSURES:****CHECKED**

The PIC will check that the brake system pressure and the hydraulic system pressure Gauge each read in the range of 1300 to 1600 psi.

**The SIC will now state “BEFORE STARTING CHECKS Complete”. The PIC will then state the type of start to be made, either Battery, Ground Power, or Generator Assisted.**

When the Twin Otter is on dedicated Smokejumper alert, the PIC will complete the BOARDING AIRCRAFT CHECK and the BEFORE STARTING CHECK at the beginning of the duty day. This allows the pilot to complete only the items with a (\*) on the checklist before engine start. This procedure will expedite the departure. The items with a (\*) can also be accomplished during enroute stops with no flight crew changes on Administrative flights. The PIC simply calls for the “STARRED ITEMS” and the appropriate checklists.

### **ENGINE START BATTERY**

#### **BOOST PUMPS**

#### **ON, LIGHTS OUT**

Lift up the FWD BOOST switch. Check that the BOOST PUMP 2 FWD PRESS and BOOST PUMP 1 FWD PRESS caution light goes out.

Lift up the AFT BOOST switch. Check that the BOOST PUMP 2 AFT PRESS and BOOST PUMP 1 AFT PRESS caution lights go out.

The following is an outline of the procedure and scan to follow when starting the engine.

Once you introduce fuel, your hand should stay on the fuel lever until the start is complete.

1. Note the battery voltage, the outside air temperature, and what direction the wind is coming from. All these factors will have an impact on the amount of the T5 rise and peak T5 encountered during the start.
2. When the BEFORE STARTING CHECK is complete, indicate to the ground crew which engine you wish to start first. After given clearance to start, both flight crewmembers will look out their respective windows to ensure the engine and prop area is free of prop ties, engine plugs, obstacles, people and call “CLEAR”.
3. Engage the start switch. As you do this watch the voltage to see if it drops, and if so, how far. Normally, the voltage will only drop when on battery power. If the voltage drops below 17 volts, and does not recover to the 20-volt range, there is a possibility that the battery power available may not be sufficient to start the engine. You may have to abort the start if Ng and T5 indications exceed allowable limitations.
4. Check the OIL PRESS gauge. Simply note that the oil pressure is rising. Because air pressure is used to seal some of the bearings, oil pressure on some engines may not rise above 40 psi until after light off. Following light off, oil pressure should be 40 psi or higher.

5. Monitor the Ng gauge for stabilization. As soon as the Ng stabilizes, introduce fuel. Do not waste time trying to get another 0.5 or 1%, as you will be depleting battery power and possibly exceeding the starter time limits. Typically, a well charged battery will give a stabilized speed of 16 to 18%. Do not introduce fuel if the Ng fails to achieve a stabilized speed above 12%.
6. Monitor the T5 gauge for light-off. The engine should light off within 10 seconds of introducing fuel. If it does not, move the fuel lever to OFF and motor the engine for another 10 seconds to evacuate the unburned fuel from the engine.
7. After light-off, monitor the T5 and Ng gauges. Ng should continue to rise steadily. There will be a surge in T5 when the secondary fuel nozzles begin providing fuel, typically between 30 and 40% Ng. At sea level and ISA temperatures, the Ng will normally stabilize at about 48% if the propeller is feathered, or 52% if the propeller is not feathered. Above 3,000 feet pressure altitude, the idle speed will be higher. Ng gauge indications will also provide warning of a “hung start”, a condition where the engine stabilizes below the normal idling value. Usually, if the engine “hangs” during the start, it will do so in the speed range where the secondary fuel should come in. If you encounter a “hung start”, select the fuel lever to OFF, and motor the starter for 10 seconds.
8. The start can be considered complete when the T5 drops from its peak value, and the Ng has stabilized at the appropriate idle Ng. When the Ng has stabilized and the T5 is in the green, release the starter switch.
9. Check the generator light. Check that the generator light has come back ON. This indicates that the starter has cut out.
10. Start the second engine in the same manner. Normally a well-charged and well-maintained battery will be able to start both engines without recharging between starts. The battery should only be recharged between starts if there is reason to believe the battery capacity is not sufficient to start the second engine.

**The engine start is now complete, and the PIC will call for “AFTER START CHECKS”.**

### **ENGINE START GROUND POWER**

EXTERNAL/BATTERY SWITCH:

EXTERNAL

A smooth switch from BATTERY to EXTERNAL will produce no power interruption.

BUS VOLTAGE:

28 VOLTS

The PIC will check that the voltmeter reads the ground power output of 28 volts.

Remember, the GPU must be capable of providing 28 VDC, 400 amp continuous, 800 amp peak load.

**BOOST PUMPS:****ON, LIGHTS OUT**

The PIC selects the boost pump switches to ON and notes that the boost pump lights on the Central Warning Panel have gone out.)

1. Note the battery voltage, the outside air temperature, and what direction the wind is coming from. All these factors will have an impact on the amount of the T5 rise and peak T5 encountered during the start.
2. When the BEFORE STARTING CHECK is complete; indicate to the ground crew which engine you wish to start first. After given clearance to start, both flight crewmembers will look out their respective windows to ensure the engine and prop area is free of prop ties, engine plugs, obstacles, people and call "CLEAR".
3. Engage the start switch. As you do this watch the voltage to see if it drops, and if so, how far. Normally, the voltage will only drop when on battery power. If voltage drops below 17 volts, and does not recover to the 20 volt range, there is a possibility that the battery power available may not be sufficient to start the engine. You may have to abort the start if Ng and T5 indications exceed allowable limitations.
4. Check the OIL PRESS gauge. Simply note that the oil pressure is rising. Because air pressure is used to seal some of the bearings, oil pressure on some engines may not rise above 40 psi until after light off. Following light off, oil pressure should be 40 psi or higher.
5. Monitor the Ng gauge for stabilization. As soon as the Ng stabilizes, introduce fuel. Do not waste time trying to get another 0.5 or 1%, as you will be depleting battery power and possibly exceeding the starter time limits. Typically, external power may give stabilized speeds as high as 23%. Do not introduce fuel if the Ng fails to achieve a stabilized speed above 12%. The practice of waiting 5 seconds after stabilization before introducing fuel only applies to aircraft that are not equipped with an auxiliary battery, which was provided as standard equipment beginning at aircraft serial number 81.
6. Monitor the T5 gauge for light off. The engine should light off within 10 seconds of introducing fuel. If it does not, move the fuel lever to OFF and motor the engine for another 10 seconds to evacuate the unburned fuel from the engine.
7. After light off, monitor the T5 and Ng gauges. Ng should continue to rise steadily. There will be a surge in T5 when the secondary fuel nozzles begin providing fuel, typically between 30 and 40% Ng. At sea level and ISA temperatures, the Ng will normally stabilize at about 48% if the propeller is feathered, or 52% if the propeller is not feathered. Above 3,000 feet pressure altitude, the idle speed will be higher. Ng gauge indications will also provide warning of a "hung start", a condition where the engine stabilizes below the normal idling value. Usually, if the engine



“hangs” during the start, it will do so in the speed range where the secondary fuel should come in. If you encounter a “hung start”, select the fuel lever to OFF, and motor the starter for 10 seconds.

8. The start can be considered complete when the T5 drops from its peak value, and the Ng has stabilized at the appropriate idle Ng. When the Ng has stabilized and the T5 is in the green arc, release the starter switch.

9. Check the generator light. Check that the generator light has come back ON. This indicates that the starter has cut out.

Start the second engine in the same manner.

#### EXTERNAL/BATTERY SWITCH

#### BATTERY

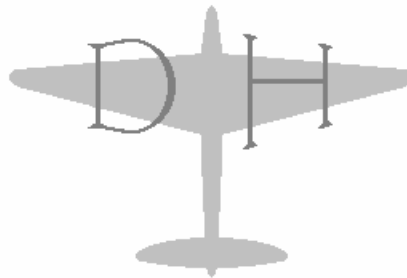
A Smooth switch from EXTERNAL to BATTERY will produce no power interruption.

#### EXTERNAL POWER

#### DISCONNECT

The PIC will signal the ground crew to disconnect the Ground Power Unit.

**The engine start is now complete, and the PIC will call for “AFTER START CHECKS”.**



**GENERATOR-ASSISTED STARTS** (GENERATOR-ASSISTED STARTS ARE NOT A NORMAL PROCEDURE, AND ARE NEITHER SUGGESTED NOR PROHIBITED BY DE HAVILLAND.)

Generator-assisted starts may be used when the pilot has encountered difficulty getting a suitable stabilized Ng from the battery during the first engine start.

During starts in very cold conditions, the battery is drawn down considerably during the first engine start, leaving the battery in a very weak condition for the second start. If the aircraft has been out in the cold for an extended period of time, the battery way also be “cold soaked.” It may not be possible or practical to charge the battery sufficiently for the second start.

During engine starts in very hot temperatures, it can be difficult to achieve a high enough

stabilized Ng to ensure T5 temperatures stay within limits during the start. With a generator-assisted start, stabilized Ng can often be raised 4-5% higher prior to introduction of fuel, which will ensure enough air-cooling for a successful start.

After the first engine has been started and is operating:

1. Set idle Ng + 15% on the operating engine.
2. Select operating engine's generator ON.
3. Recharge the battery until the battery load is 0.4 or less.
4. Select both GENERATOR switches to OFF.
5. Advance the power lever of the operating engine to 80% Ng. This high Ng will help minimize T5 rise on the operating engine when the generator is selected ON during step 6.
6. Engage the START switch.
7. When Ng stabilizes, select the GENERATOR switch of the operating engine to RESET and then ON.
8. When Ng of the engine being started has risen and stabilized again (above 12%), move the FUEL lever of that engine to ON.
9. When start is complete, and the propeller has stabilized at approximately 45% Np, advance the power lever to idle Ng + 15%, and select the associated generator ON.
10. When the generator loads are less than 0.5, the power levers may be brought back to idle.

### **\*AFTER START CHECKS**

#### **POWER LEVERS:**

**IDLE Ng + 15%**

The PIC will advance the Power levers to approximately 66% Ng so that when the generators are brought on line the engines are prepared for the extra workload.

#### **GENERATORS:**

**ON, GENERATOR LIGHTS OUT**

As the PIC selects each generator on line, he/she note that the associated GENERATOR light on the Caution Light Panel goes out, and that T5 remains within limits with the Generator on line.

#### **LOADMETER:**

**LESS THAN 0.5 GEN LOAD**

The loadmeter normally reads the draw on the battery. Toggle the loadmeter switch to the left to read the draw on the left generator, and to the right to read the draw on the right generator. When the draw is less than 0.5 on the generators, the power levers may be pulled back to flight idle.

#### **ENGINE INSTRUMENTS:**

**STABLE & WITHIN LIMITS**

The PIC will review the engine instruments for proper values within limits and call "checked".

RADIO MASTERS SWITCHES: ON

The PIC will select the two radio master switches to the ON position.

GPWS: CHECKED

When the test button is held in, you should hear “Bank angle, pull-up, pull-up, pull-up, pull-up”.

COMPASS AND GYROS: CHECKED & SET

The PIC checks the magnetic compass and heading indicated on the RMI and HSI and Calls “\_\_\_\_ TWICE, COMPASS CHECKED”. The SIC checks that the right side Gyro is in agreement.

CAUTION LIGHTS: APPROPRIATE

The caution lights should all be out with the exception of PNEUMATIC LOW PRESS, which is normal to have on at low power settings.

ALTIMETERS AND CLOCKS: SET

Both pilots set the current altimeter setting in their respective altimeters and verify that their altimeter reads field elevation. The PIC sets the current altimeter setting in the GPS And checks that the clock is correct and calls “\_\_\_\_ set left and center, clock checked”. The SIC calls “altimeter set right”.

GPU AND BOARDING STAIRS: REMOVED & CLEAR

The PIC confirms that the power cart and ramp have been moved clear of the aircraft.

**The SIC will now call “AFTER START CHECKS complete, TAXI CHECKS next”.**

The PIC will call “TAXI CHECKS” when ready.

### **\*TAXI CHECKS**

The PIC will release the Parking brake, and before moving the aircraft will visually check to see that all is clear to taxi on the left side of the aircraft, and ask the SIC to “CLEAR RIGHT”.

BRAKES: CHECKED

As the aircraft begins to move, the PIC will apply the brakes to assure proper function.

NOSEWHEEL STEERING: CHECKED

The PIC will command a turn each direction to verify that the nosewheel steering is functioning properly. As he or she does this, the SIC will hold the nosewheel steering warning system switch to test. The PIC will verify that the nosewheel not centered warning light illuminates unless the tiller is in the centered position.

**GYROS & TURN NEEDLES****CHECKED**

Both crewmembers will observe that their respective gyroscopic instruments and turn needles are functioning properly.

**The SIC will now call “TAXI CHECKS complete”.**

The PIC will position the aircraft in a suitable run-up area and will call “RUN-UP CHECKS”.

**DHC-6 RUN-UP CHECKS****PARKING BRAKE****SET****PROP FEATHER****CHECKED**

The PIC will pull the propeller levers to the feather position, verify that the props feather and stabilize at approximately 23% on the Np gauge, then select the prop levers to full forward.

**PROP RESET LIGHTS****CHECKED**

During the prop feather check (above), note that the PROP RESET light on the Caution Light Panel comes on as the prop lever is pulled back from the full forward position, and that the light goes out when the prop levers are repositioned to the full forward position.

**BETA RANGE LIGHTS****CHECKED**

Retard the power levers from flight idle towards reverse until the left and right Beta Range Lights come on. Return the power levers to the flight idle position and check that the Beta range lights are off.

**BETA BACKUP****TEST**

1. Power levers set at flight idle
2. Prop levers set at max rpm
3. Retard the left power lever into the reverse range, until the beta range light comes on.
4. Lift and hold the BETA RANGE TEST Switch. Check that the BETA BACKUP/DISARMED light and the beta range light come on and go out for two complete cycles while the beta backup system functions.
5. Release the BETA RANGE TEST Switch.
6. Return the power levers to flight idle.
7. Retard the right power lever into the reverse range, until the beta range light comes on.
8. Lift and hold the BETA RANGE TEST Switch. Check that the BETA BACKUP/DISARMED light and the beta range light come on and go out for two cycles while the beta backup system functions.
9. Release the BETA RANGE TEST Switch and return the power levers to flight idle.

**PROP OVERSPEED****TEST**

1. With the power levers at flight idle, check that the oil pressures are above 40 psi and oil temperatures are above 10 degrees C.
2. Set the prop levers at max rpm.
3. Lift and hold the PROP GOV TEST Switch.
4. Advance both power levers slowly and check that both propellers govern at approximately 70% Np.
5. Return the power levers to flight idle.
6. Release the PROP GOV TEST Switch.

**AUTOFEATHER****ON/TEST**

1. With the power levers at flight idle, check that the oil pressures are above 40 psi and oil temperatures are above 10 degrees C
2. Prop levers set at Max rpm.
3. Select the Autofeather system on, and check that the autofeather SELECT light illuminates.
4. Advance both power levers to approximately 25 lbs torque.
5. Lift and hold the AUTO FEATH TEST Switch, and check that the amber ARM light illuminates.
6. Select the left power lever to flight idle, and check that the left propeller feathers approximately 2 seconds later. Check that the autofeather ARM light goes out.
7. Select the right power lever to flight idle, and check that the right propeller does not feather. The left propeller will begin to come out of feather when both power levers are at flight idle. Wait until the propeller has unfeathered.
8. Advance both power levers to approximately 25 lbs torque, and check that the amber ARM light illuminates.
9. Retard the right power lever to flight idle, and check that the right propeller feathers approximately 2 seconds later. Check that the autofeather ARM light goes out.
10. Select the left power lever to flight idle, and check that the left propeller does not feather. The right propeller will begin to come out of feather when both power levers are at flight idle.
11. Release the AUTO FEATH TEST Switch.
12. Advance the left power lever to 88% Ng, and check that the amber ARM light is not illuminated.
13. Advance the right power lever to 88% Ng, and check that the amber ARM light is illuminated.
14. Retard the left power lever below 88% Ng, and check that the amber ARM light goes out.
15. Retard the right power lever below 88% Ng.
16. Set the Autofeather Switch as required.

**POWER LEVER MICROSWITCH CHECK****CHECKED**

1. Set the power levers to idle.
2. Press and hold the PWR LEV TEST button, and check that the green light in the button illuminates.
3. Release the PWR LEV TEST button.

**ANTI-ICE/DE-ICE****CHECKED**

If there is any chance that you may encounter icing conditions, it is good practice to check the operation of the Anti-ice and De-ice systems.

1. Set the power levers to idle Ng + 15%. Select the BLEED AIR Switches on, and check that the PNEUMATIC LOW PRESS caution light goes out.
2. Select the Manual/Auto Switch for the Deicer Boots to Manual. Toggle each boot switch (Inner Wing/Outer Wing, and Left Stab/Right Stab while a ground crew member visually checks inflation of each boot. Note that the appropriate STAB DEICE PRESS blue light illuminates when the stabilizer boots are inflated.
3. Advance the power levers to 80% Ng, select the Intake Deflector Switch to Extend for 3 to 5 seconds, and check that the EXT shows on the "Doll's Eye" Indicators. Momentarily select Retract on the Intake Deflector Switch to retract the deflectors. Retard the power levers to flight idle, and select the BLEED AIR switches ON or OFF, as appropriate.
4. Select both generators off. Switch on, then off in turn the VALVE HTR switch, the WINDSHIELD HEAT switch, and the PROP DEICE switch, checking for amperage draw on the battery. Select the generators to ON.

**AUTOPILOT****CHECKED**

1. Check that the attitude indicator is erect, the heading indicator is slaved, and that no warning flags are in view.
2. Select ENG on the ENG/DIS switch, and check that the ENG annunciator light comes on.
3. Turn the Autopilot Annunciator Dimmer Switch fully clockwise and check that all annunciator lights come on. Adjust light level as required.
4. Apply a gentle force to the controls, one axis at a time, to check that the autopilot has engaged.
5. Pitch Control Knob.....DOWN. The control yoke should move forward, the TRIM DN light should flash, and the TRIM IN MOTION light should come on.
6. Pitch Control Knob.....UP. The control yoke should move rearward, the TRIM UP light should flash, and the TRIM IN MOTION light should come on.
7. Roll Control Knob.....LEFT, THEN RIGHT. Check that the control wheel moves left, then right.
8. Control Yoke.....PULL BACK AND HOLD. After a few seconds, the TRIM DN light should flash, and the TRIM IN MOTION light should come on.

9. AFCS DISC Button.....PRESS. Check that the DIS light comes on, the autopilot does disengage, and that the controls may be moved freely.
10. Set the heading bug to the present aircraft heading, engage the autopilot, and press the HDG button. Move the heading bug 10 degrees right and then 10 degrees left of the present heading. Check that the control wheel moves left and right, and that the flight director command bars command the appropriate left or right bank.
11. Tune the number 1 navigation radio to a local VOR. Adjust the course arrow to center the track bar and obtain a "TO" indication. Press the NAV button on the autopilot. Adjust the course arrow left, then right 10 degrees. Check that the control wheel moves left and right, and that the flight director command bars command the appropriate left or right bank.
12. Press the APPR button. Adjust the course arrow left, then right 10 degrees. Check that the control wheel moves left and right, and that the flight director command bars command the appropriate left or right bank.
13. Tune the number 1 navigation radio to any unused localizer frequency. Engage the autopilot and then press the G/A button. Check that the autopilot disengages and that the flight director bars move to a wings level, pitch up attitude.
14. Engage the autopilot. Press the CWS button. Check that the control wheel can be freely moved in all directions. Release the CWS button. Check that the autopilot re-engages and holds the control wheel in the position selected.
15. Engage the autopilot. Engage the yaw damper. Check that the YAW DAMP light illuminates. Press the AFCS DISC button. Check that the autopilot disengages, the yaw damper disengages and the YAW DAMP light goes out, and that the flight controls have full and free movement in all six directions.

**The SIC will now call "RUN-UP CHECKS complete".**

The PIC will call for "BEFORE TAKE-OFF CHECKS" when he or she is ready.

### **\*BEFORE TAKE-OFF CHECKS**

#### **TRIM TABS**

#### **SET**

The PIC will assure that the elevator, rudder, and aileron trims are set for take-off.

#### **FLAPS**

#### **SET 10 DEGREES**

The SIC will select flaps to 10 degrees, and state "Flaps set and indicating 10 degrees"

#### **FLIGHT INSTRUMENTS**

#### **CHECKED**

The SIC will check both airspeed indicators, artificial horizons, headings on RMI, HIS, and wet compass, and VVI indications. A typical response from the SIC could be "zero airspeed, zero pitch and bank, no flags, 280-282-280 on the headings, zero VVI left and right".

## NAV/COM RADIOS

## SET

The PIC will verify that the Com radios are tuned to the desired frequencies, and the desired frequencies are tuned and identified on the NAV radios.

## CREW BRIEFING

## COMPLETE

The pilot flying will give a take-off briefing with the following minimum information and sequence.

1. This will be a flaps \_\_\_\_take-off on runway\_\_\_\_, we weigh\_\_\_\_\_pounds.
2. I will initiate power advance and ask you to set computed take-off power.
3. You will monitor the engine instruments and caution lights and call out any abnormalities.
4. In the event of a malfunction prior to rotation I will reject the take-off. If we are airborne I will continue. My call outs will be “Set max power, set flaps 10, confirm autofeather”. We will take no actions below 400 feet except to feather a failed engine that has not autofeathered.
5. For an emergency return, plan to fly a \_\_\_\_\_approach to runway XX.
6. The highest obstacle on departure is\_\_\_\_\_.
7. The heading bug is set to XXX degrees. The radio and nav aids are set to\_\_\_\_\_.
8. Departure instructions are\_\_\_\_\_.
9. Any questions?

The pilot flying may have accomplished the take-off briefing prior to this point. If such is the case, he or she will state, “reviewed”.

## PROPS

## FORWARD

The PIC will verify that the propeller levers are full forward.

## AUTOFEATHER

## SELECTED ON

The PIC will verify that the autofeather system is selected on.

## ENGINE INSTRUMENTS

## CHECKED

The SIC will scan the engine instruments to see that they are stable and within limits.

## BLEED AIR

## CHECKED/SET AS NEEDED

The PIC will verify that the bleed air switches are in the desired position.

## ANTI-ICE/DEICE

## CHECKED/SET AS NEEDED

The PIC will check that the appropriate and desired ice protection has been selected.

**The SIC will now call “BEFORE TAKE-OFF CHECKS complete”.**

The PIC will call for “LINE-UP CHECKS” when he or she is ready.



**\*LINE-UP CHECKS****FLIGHT CONTROLS****FREE/FULL TRAVEL**

The PIC will manipulate the controls thru the full range of their motion to assure proper function.

**TRANSPONDER****ON**

Turn the transponder on and verify the correct code has been set.

**LANDING LIGHTS & STROBE****ON**

The PIC will select the pulse lights ON for daytime operations or the landing lights for nighttime operations and the strobes (N141Z) for all operations.

**CAUTION LIGHTS****APPROPRIATE**

The PIC will check for appropriate illumination of the caution lights.

**RUNWAY AND HEADING****CHECKED**

The PIC will line the aircraft up with the runway, center the nosewheel steering lever, and crosscheck the runway and heading indicators.

**The SIC will now call “LINE-UP CHECKS complete”.**

If the crewmember in the right seat will be the pilot flying, a positive transfer of the controls at this point in time.

After take-off and climbing through 400 ft AGL, the pilot not flying will call “400 feet”.  
The pilot flying will call:

FLAPS UP, AUTOFEATHER OFF,  
CLIMB POWER,\* **CLIMB CHECKS**

The pilot not flying will select the flaps to zero degrees, and then complete the CLIMB CHECKS silently until the last item on the checklist, and will challenge:

**NOSEWHEEL STEERING****CENTERED**

Both crewmembers will visually check that the nosewheel steering lever is in the centered position.

**The non-flying pilot will now call “Climb Checks complete”.**

**\*CRUISE CHECKS**

After silently completing the cruise check items, the pilot not flying will verify the checklist is complete by calling “CRUISE CHECKS complete”.

**\*DESCENT CHECKS****FUEL QUANTITY/SELECTOR****CHECKED/NORMAL**

The PIC will visually check that the fuel selector is **NORMAL** and that there is enough fuel to arrive at the destination airport with appropriate reserves.

**BRAKE/HYDRAULIC PRESSURES****CHECKED**

The PIC will visually check the hydraulic system and brake system gauges for pressure Between 1300 and 1500 psi.

**CAUTION LIGHTS****APPROPRIATE**

The PIC visually checks the caution lights for appropriate illumination.

**ANTI-ICE/DE-ICE****AS NEEDED**

The PIC will assure that the anti-ice and de-ice protection is set as needed for the prevailing and expected conditions.

**ALTIMETERS****SET**

Each crewmember will set the appropriate altimeter setting in his or her respective altimeter and call “\_\_.\_ set left” and “\_\_.\_ set right”.

**APPROACH BRIEFING****COMPLETE**

The pilot flying will give an approach briefing with the following minimum information and sequence:

**IFR**

1. The pilot flying will engage the autopilot and request the pilot not flying to monitor the aircraft or will request the pilot not flying to take the controls and fly the aircraft.
2. The pilot doing the briefing will state the name and location of the airport, the type of approach to be flown, and the landing runway.
3. The pilot will state the minimum visibility required to complete the approach, Navigation frequencies to be used, final approach course information, glide slope intercept or initial approach altitude, MDA or DA, timing to the MAP if required, airport elevation, and missed approach instructions.
4. The landing weight, flap setting, approach speed, and landing speed will be reviewed.

**VFR**

1. The pilot will state the landing runway and the planned pattern entry.
2. The wind speed and direction will be noted.
3. The landing weight, flap setting, and approach speeds will be reviewed.

## INSTRUMENT APPROACH

The pilot not flying (PNF) will call “1000 feet above minimums” when the aircraft is 1000 feet above approach minimums, and will monitor course and glideslope or altitude deviations, airspeed, and sink rate. The PNF will call “500 feet” and “100 feet” respectively above MDA or DA. If the runway environment is in sight, the PNF will call out what is seen (i.e. “approach lights in sight” or “runway in sight at 2 o’clock”). If the transition to visual conditions occurs prior to approach minimums, the altitude call outs will cease. If no runway environment is in sight at the missed approach point (MAP) or DA, the PNF shall call “missed approach”.

The pilot doing the briefing will call “Approach Briefing Complete”, and resume control of the aircraft.

SEAT BELT SIGN ON

The seat belt sign shall be turned on at this time.

LANDING LIGHTS ON

The pilot not flying will select pulse lights or landing lights as appropriate and call “ON”.

**The pilot not flying will call “DESCENT CHECKS Complete”.**

### **\*BEFORE LANDING CHECKS**

Note: The pilot flying may call for Flaps 10 Degrees prior to the BEFORE LANDING Checklist.

NOSEWHEEL CENTERED

Both pilots will visually check that the nosewheel is centered.

YAW DAMPER OFF

Visually check that the yaw damper is not engaged. It is good practice for the pilot flying to gently use the rudder pedals back and forth to verify that it is truly so.

FLAPS SET, INDICATING \_\_\_\_ DEGREES

The pilot not flying will set the flaps as commanded by the pilot flying, and verify that The desired setting is also shown on the flap position indicator.

PROPELLERS FORWARD

The pilot not flying will move the propeller levers to the maximum forward position.

**The pilot not flying will call “BEFORE LANDING CHECKS Complete”.**

**\*AFTER LANDING CHECKS**

The PIC will call for the AFTER LANDING CHECKS after clearing the runway. These checks can be done by the SIC silently, who upon completion will call “AFTER LANDING CHECKS Complete”.

FLAPS	UP
BLEED AIR	OFF
ANTI-ICE/DEICE	OFF
LANDING LIGHTS/STROBE	OFF
TRANSPONDER AND RADAR	OFF
TRIM TABS	RESET FOR TAKE-OFF

**\*SHUT-DOWN CHECKS**

After taxiing to where the aircraft will be parked, the PIC will set the parking brake And call for the “SHUT DOWN CHECKLIST”.

PARKING BRAKE	SET
RADIO MASTERS	OFF
POWER LEVERS	FLIGHT IDLE
PROPS	FEATHER
The propellers should be in feather for at least 30 seconds before shutting the fuel levers off.	
GENERATORS	OFF
FUEL LEVERS	OFF
The T5 should be stable below 585 degrees C before shutting the fuel off.	
BOOST PUMPS	OFF
ALL LIGHT SWITCHES	OFF
D.C. MASTER	OFF
The pilot should check the Ng and T5 gauges to verify the engines have come to rest before shutting off the electrical power.	

BATTERY SWITCH

OFF

CONTROL LOCKS

INSTALLED